

(PCT Article 36 and Rule 70)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/053040

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-9 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* 1-3 received by this Authority on 01.09.2005 with letter of 29.08.2005
- nos.* _____ received by this Authority on _____
- ☒ the drawings:
- sheets 1/5-5/5 as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1.	Statement		
	Novelty (N)	Claims <u>1-3</u>	YES
		Claims _____	NO
	Inventive step (IS)	Claims _____	YES
		Claims <u>1-3</u>	NO
	Industrial applicability (IA)	Claims <u>1-3</u>	YES
		Claims _____	NO
2.	Citations and explanations (Rule 70.7)		
1.	Reference is made to the following documents:		
	D1: US-A-5 396 131 (MIKI TAKAHIRO ET AL) 7 March 1995 (1995-03-07)		
	D2: US-A-5 539 406 (MIKI TAKAHIRO ET AL) 23 July 1996 (1996-07-23)		
2.	D4 was not cited in the international search report. A copy of said document is attached.		
	D4: US-A-2003/0067346 (GAGGL RICHARD) 10 April 2003 (2003-04-10)		
	<u>Claim 1</u>		
2.	The present application fails to meet the requirements of PCT Article 33(1) , since the subject matter of claim 1 does not involve an inventive step as defined by PCT Article 33(3) .		
2.1	D1 is considered to be the closest prior art.		
2.2	D1 describes (the references between parentheses apply to said document) an analog-to-digital converter having differential inputs and a parallel structure (column 1, lines 8 to 13 and figures 1 to 4), including at least		

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	<p>one network of N series resistors of value r (column 6, lines 8 to 30 and figure 2, block 5, figure 3, resistors 111 to 115) and a network of N comparators (column 6, lines 8 to 17 and figure 2, blocks 61 to 6n), such that:</p> <ul style="list-style-type: none"> - the network of series resistors receives a reference voltage (figure 3, blocks 101 and 102) and has a constant current running through it (column 6, lines 18 to 30); - the rank i comparator (figure 4, block 61) essentially includes a double-differential, four-input amplifier (from column 7, line 54 to column 8, line 55 and figure 4, block 400 and inputs VA1, VA2, VR1a and VR1b), of which two inputs receive a differential voltage VS-VN to be converted (from column 6, line 41 to column 7, line 53 and figure 4, inputs VA1 and VA2), a third input is connected to a rank i resistance of the network (column 6, lines 46 to 50 and figure 4, VR1a), and a fourth input is connected to a rank N-i resistance of the network (column 6, lines 46 to 50 and figure 4, VR1b); said double-differential amplifier provides a voltage representing a difference having the form $(VS-VN)-(N-2i)r.I_o$ (tables 2 and 3), and the comparator switches one way or the other according to the level of the voltage VS-VN and according to the rank i of the comparator when the sign of said difference changes (from column 6, line 58 to column 7, line 52 and figures 12 to 13). <p>2.3 The subject matter of claim 1 differs from D1 in that the network of resistors is supplied with a variable</p>

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	<p>reference voltage from a servo circuit by means of which the voltage level of the middle of the network of resistors is slaved to a voltage equal to the common mode voltage of the differential voltage to be converted.</p> <p>2.4 The problem that the present invention is intended to solve can be considered to be that of implementing an analog-to-digital converter having differential inputs and a parallel structure that prevents possible erroneous indications caused by spurious variations on the same circuit.</p> <p>2.5 According to the description provided therein, the device of D4 (page 2, paragraph [0019]; page 3, paragraphs [0045] to [0046]; claims 1, 5, 10 and figure 2, <i>Vfloat</i>) has the same advantages as those mentioned in the present application. Consequently, the inclusion of this feature in the analog-to-digital converter described in D1 is a routine design measure for a person skilled in the art seeking to solve the stated problem.</p> <p>2.6 Consequently, the subject matter of claim 1 does not involve an inventive step as defined by PCT Article 33(3).</p> <p><u>Claims 2 and 3</u></p> <p>3. Dependent claims 2 and 3 contain no feature which, when combined with the features of any one of the claims to which they refer, defines subject matter that complies with the PCT requirements of inventive step (PCT Article 33(3)), for the following reasons:</p>

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	<ul style="list-style-type: none">- the additional features defined in claim 2 are well known in analog-to-digital converters having a parallel structure, and therefore the subject matter of said claim does not involve an inventive step;- the additional features defined in claim 3 are disclosed in D1 (figure 4). <p><u>Industrial applicability</u></p> <p>4. The subject matter of claims 1 to 3 is industrially applicable in the field of analog-to-digital converters.</p>